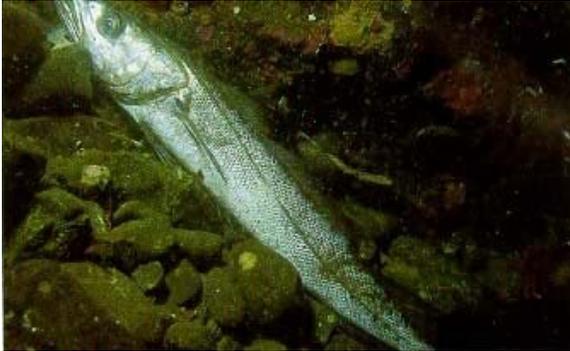


Common name: Pacific hake (Georgia Basin DPS)



Scientific name: *Merluccius productus* (Georgia Basin DPS)

Area of Concern: Puget Sound

Year First Listed as a “Species of Concern”: 1999

Species Description:

Pacific hake, *Merluccius productus* (Ayres, 1855), also known as Pacific whiting, is a gadiform groundfish that is currently the most abundant commercial fish species on the U.S. West Coast (Methot and Dorn 1995). There are three recognized stocks of Pacific hake: a highly migratory offshore (or coastal) stock that ranges from southern California to Queen Charlotte Sound, a central-south Puget Sound stock, and a Strait of Georgia (SOG) stock. Pacific hake are silvery on the back grading to whitish ventrally and can reach up to 91 cm in length and 15 years of age. Pacific hake have two dorsal fins and a truncate caudal fin. Pectoral fin tips usually reach to or beyond the origin of anal fin. The caudal fin is always concave. Pacific hake are nocturnal feeders on a variety of fishes and invertebrates and are an important prey item for sea lions, small cetaceans, and dogfish sharks.

The offshore Pacific hake stock spawned off south-central California to Baja California in the winter months of January and February during the 1960s, 1970s and 1980s (Methot and Dorn 1995, McFarlane et al. 2000). In spring and summer adults migrated northward to feed to as far as central Vancouver Island (and as far as Queen Charlotte Sound in some years). In the fall, adults migrated southward toward spawning grounds. Since the early 1990s a percentage of the offshore stock has remained off the west coast of Canada year round and some Pacific hake have been observed spawning off the west coast of Vancouver Island (McFarlane et al. 2000).

Resident Pacific hake in Puget Sound spawn in Port Susan (Pedersen 1985) and Dabob Bay (Bailey and Yen 1983) from February through April, although Dabob Bay has never supported a fishery. The SOG resident stock aggregates to spawn in the deep basins of the south-central Strait of Georgia where peak spawning occurs from March to May (Shaw et al. 1990).

Pacific hake may spawn more than once per season, so absolute fecundity is difficult to determine. Pacific hake are oviparous with external fertilization. Historically, inshore female Pacific hake matured at 37 cm and 4-5 years of age. Currently, length at 50% maturity for females in the Port Susan Pacific hake population is approximately 21.5 cm, compared to 29.8 cm in the 1980s. Females of the offshore stock mature at 3-4 years and 34-40 cm and nearly all males are mature by age 3 and as small as 28 cm. By age 3, most offshore Pacific hake become available to the mid-water trawl fishery, although Pacific hake between ages 6 and 11 are most commonly caught.

Previously, the offshore, SOG, and Puget Sound stocks have been considered discrete from one another for management purposes on the basis of differences in: 1) allozyme frequencies 2) spawning localities, 3) size- and age-at-maturity, 4) growth, 5) year-class strength, 6) effective fecundity, 7) otolith morphology and annuli formation, and 8) the degree of infestation with a protozoan parasite (Gustafson et al. 2000).

Rationale for “Species of Concern” Listing:

Demographic and Diversity Concerns:

Historically, spawning Pacific hake in Port Susan were likely overfished. The biomass of Pacific hake in Port Susan during the spawning period has declined by 85% over the past 15 years, yet numbers have fluctuated around 30 million fish until dropping to less than 11 million in 2000. Over the same period, size composition and size-at-maturity for females have also decreased substantially. In contrast, significant declines in biomass, fish size, or maturity for Pacific hake populations in the Canadian portion of the Strait of Georgia were not evident at the time of the status review. Recently, however, the population biomass in the Strait of Georgia has begun to decline, apparently a result of declining size-at-age of age 3+ hake, although population numbers of hake appear to be stable. Although Puget Sound Pacific hake are severely depressed, Strait of Georgia Pacific hake are estimated to be ten times as abundant, and are not believed to be at risk of extinction.

At the time of the status review, the BRT identified several areas of uncertainty regarding the relationship among stocks and effects of potential risk factors. The extent of any mixing of spawning products or spawners among stocks within the Georgia Basin is unknown. A majority of the BRT felt that significant population structuring may exist within this region and that up-to-date studies of the genetic analyses of spawning aggregations would be necessary to adequately define this structure. Information about population structure is also considered crucial to the BRT's decision concerning extinction risk for Pacific hake because its abundance in the Strait of Georgia has not declined markedly over the past 15 years. Risk factors are also poorly known and for the most part, the BRT could only speculate on potential factors and their effects.

Factors for decline  
Overfishing

Status Reviews/Research Completed or Underway:

NMFS conducted a status review (Gustafson et al. 2000) and determined that the species did not warrant listing (65 FR 70514, November 24, 2000). However, concerns and uncertainties still remain, and therefore, NMFS retained this species on the species of concern list.

References:

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- Pedersen, M. 1985. Puget Sound Pacific whiting, *Merluccius productus*, resource and industry: an overview. Mar. Fish. Rev. 47:35-38.
- Shaw, W., G. A. McFarlane and R. Kieser. 1990. Distribution and abundance of the Pacific hake (*Merluccius productus*) spawning stocks in the Strait of Georgia, British Columbia, based on trawl and acoustic surveys in 1981 and 1988. Int. North Pac. Fish. Comm. Bull. 50:121-134.

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